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Abstract: 88O

A novel triglyceride tethered bilayer lipid membrane (tBLM) architecture

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Tethered bilayer lipid membranes (tBLMs) are model cell membranes that can be anchored to a conductive metal substrate. Used in conjunction with electrical impedance spectroscopy, they are a valuable tool for research into the properties of lipid bilayer interactions with proteins, peptides and toxins. Using electrical impedance spectroscopy (EIS) we show that the triglyceride, *triolein* (1,2,3-Tri(cis-9-octadecenoyl)glycerol), can create a stable tBLM architecture. These triglyceride membranes form tBLMs that are slightly leakier than the well-established phospholipid membranes. However, their capacitance properties suggest they are of a similar thickness to standard phospholipid membranes There is the possibility that the triglyceride tBLMs formed are multilamellar instead of the desired unilamellar membranes. We, therefore, tested triolein tBLMs using neutron reflectometry (NR) in order to determine their membrane thickness and water volume fraction. The NR data shows that triolein tBLMs typically form as a bilayer over the gold substrate. Overall, this study shows that a stable triglyceride tBLM architecture can be formed which has the potential to be used as a sensor for detecting lipase enzymatic activity with applications in industry, research and biomedical diagnostics.

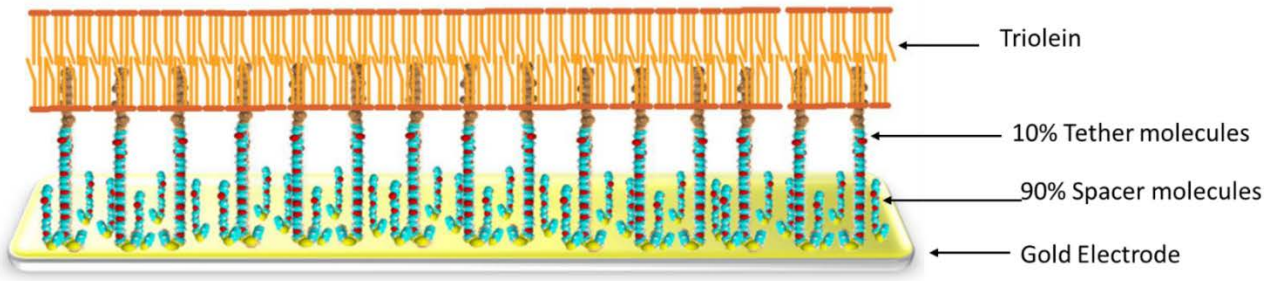

Figure 1: Triolein tethered bilayer lipid membrane (tBLM) architecture. 90% spacer and 10% tethering molecules are bound to a gold electrode. Electrical Impedance Spectroscopy (EIS) can then be used to determine the actions of lipase enzymes on this model lipid membrane.